Claims:

1. A process for the production of acetic acid by carbonylating methanol and/or a reactive derivative thereof with carbon monoxide in a carbonylation reaction zone containing a liquid reaction composition comprising an iridium carbonylation catalyst, methyl iodide co-catalyst, a finite concentration of water, acetic acid, methyl acetate, at least one promoter selected from ruthenium, osmium and rhenium and a stabilising compound selected from the group consisting of alkali metal iodides, alkaline earth metal iodides, metal complexes capable of generating I-, salts capable of generating I-, and mixtures of two or more thereof wherein the molar ratio of promoter to iridium is greater than 2 : 1, and the molar ratio of stabilising compound to iridium is in the range [greater than 0 to 5] : 1.

2. A process according to claim 1 wherein the process comprises the further steps of:

(a) withdrawing liquid reaction composition together with dissolved and/or entrained carbon monoxide and other gases from said carbonylation reaction zone;

(b) optionally passing said withdrawn liquid reaction composition through one or more further reaction zones to consume at least a portion of the dissolved and/or entrained carbon monoxide;

(c) passing said composition from step (a) and optional step (b) into one or more flash separation stages to form (i) a vapour fraction comprising condensable components and low pressure off-gas, the condensable components comprising acetic acid product and the low pressure off-gas comprising carbon monoxide and other gases dissolved and/or entrained with the withdrawn liquid carbonylation reaction composition and (ii) a liquid fraction comprising iridium carbonylation catalyst, promoter and acetic acid solvent;

(d) separating the condensable components from the low pressure off-gas; and

(e) recycling the liquid fraction from the flash separation stage to the carbonylation reactor.

3. A process according to claim 1 or claim 2 wherein the molar ratio of promoter : iridium is in the range [greater than 2 to 15] : 1.

4. A process according to claim 1 or claim 2 wherein the molar ratio of promoter : iridium is in the range [greater than 2 to 5] : 1.

5. A process according to 3 wherein the molar ratio of promoter : iridium is in the range [4 to 10] : 1

6. A process according to claim 3 wherein the molar ratio of promoter : iridium is in the range [6 to 12] : 1

7. A process according to claim 3 or claim 4 wherein the molar ratio of stabilising compound : iridium is in the range [0.05 to 3] : 1

8. A process according to claim 7 wherein the molar ratio of stabilising compound : iridium is in the range [0.05 to 1.5] : 1.

9. A process according to claim 5 or claim 6 wherein the molar ratio of stabilising compound : iridium is in the range [0.15 to 2.5] : 1.

10. A process according to claim 9 wherein the molar ratio of stabilising compound : iridium is in the range [0.15 to 2] : 1.

11. A process according any one of claims 1 to 10 wherein the stabilising compound is selected from the group consisting of alkali metal iodide, alkaline earth metal iodide, alkali metal salts capable of generating iodide ions and alkaline earth metal salts capable of generating iodide ions.

12. A process according to claim 11 wherein the stabilising compound is an alkali metal iodide or an alkali metal salt capable of generating iodide ions.

13. A process according to claim 12 wherein the stabilising compound is selected from lithium iodide, lithium acetate, sodium iodide and sodium acetate.

14. A process according to any one of claims 1 to 13 wherein the stabilising compound is introduced directly into the reaction zone or is introduced indirectly into a reaction zone.

15. A process according to claim 14 wherein the wherein the stabilising compound is introduced into the reaction zone via a recycle stream.

16. A process according to claim 15 wherein the recycle stream is a catalyst recycle stream.

17. Use of a compound selected from the group consisting of alkali metal iodides, alkaline earth metal iodides, metal complexes capable of generating I-, salts capable of generating I-, and mixtures of two or more thereof to stabilise the catalyst and/or promoter under reduced levels of carbon monoxide in a process for the production of acetic acid by carbonylating methanol and/or a reactive derivative thereof with carbon monoxide in a carbonylation reaction zone containing a liquid reaction composition comprising an iridium carbonylation catalyst, methyl iodide co-catalyst, a finite concentration of water, acetic acid, methyl acetate and at least one promoter selected from ruthenium, osmium and rhenium.

18. Use according to claim 17 wherein the molar ratio of stabilising compound to iridium is in the range [greater than 0 to 5] : 1.

19. Use of a compound selected from the group consisting of alkali metal iodides, alkaline earth metal iodides, metal complexes capable of generating I-, salts capable of generating I-, and mixtures of two or more thereof to solubilise a catalyst system precipitate, the catalyst system precipitate comprising iridium and/or at least one promoter selected from ruthenium, osmium and rhenium and having been formed under reduced levels of carbon monoxide in a process for the production of acetic acid by carbonylating methanol and/or a reactive derivative thereof with carbon monoxide in a carbonylation reaction zone containing a liquid reaction composition comprising an iridium carbonylation catalyst, methyl iodide co-catalyst, a finite concentration of water, acetic acid, methyl acetate and at least one promoter selected from ruthenium, osmium and rhenium.

20. Use according to claim 19 wherein the catalyst system precipitate is formed in a second reaction zone and/or in the acetic acid product recovery section.